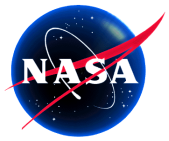

MODEM LINK PROPERTY ADVERTISEMENT

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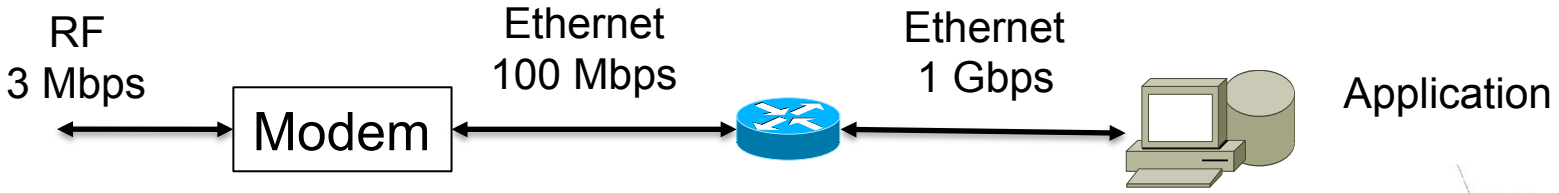
Smart Modems

- Modem's transmitting and receiving link rates can be varied over time due to the following:
  - Adaptive coding
  - Changes in Modulation to suit the channel characteristics.
  - Changes in transmission rate to suit the channel characteristics
- Rate mismatch between RF link local area network.
  - Serial connections are less of a problem as clocks can be controlled by modem (at least the receiving clock)
  - Ethernet connections are becoming standard and result in rate mismatch between the LAN interface and the RF link.



Issue / Problem

- To condition traffic and get the most out of the modem's link capacity, applications need to know the modem's link conditions.
  - Figure 1 corresponds to existing commercial imaging satellites
  - Figure 2 is more generic
- Desire is to have a standard method for the application to understand the link conditions and adjust
  - Link Up/Down
  - Link Unreliable
  - Data Rates

Figure 1

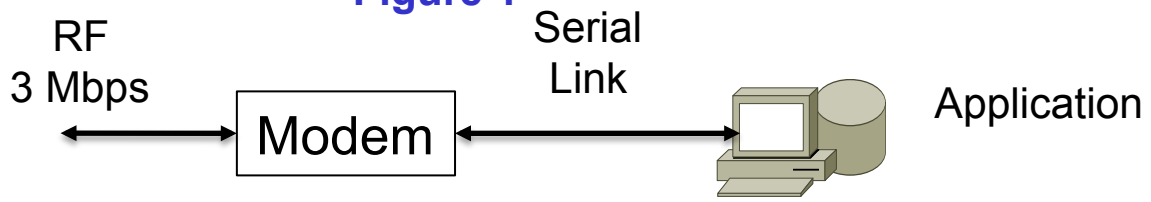
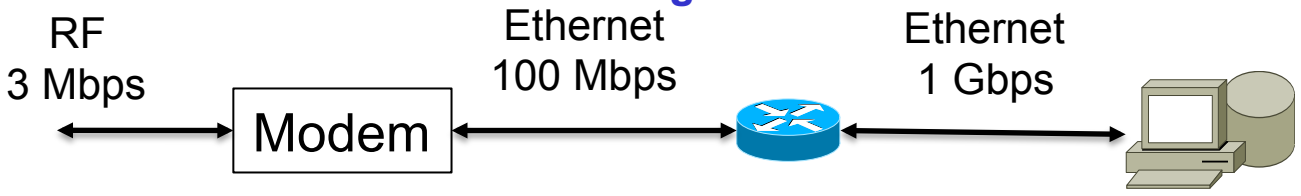


Figure 2



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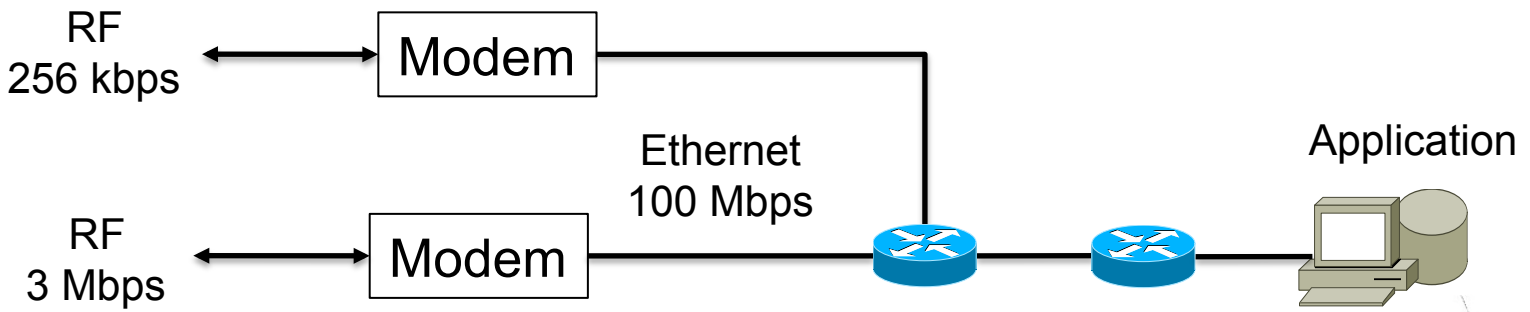
Solution

- Develop a standard protocol that provides link status conditions
  - Probably should be able to provide wide area network (WAN) radio reachback link status to applications that may be multiple hops away.
- Uses
  - Applications can adjust to link state
  - Route Optimization
    - Useful for multi-homed systems



Strategy

- Release public request for participation to radio system providers and information system manufacturers
- Possible Starting Points
  - RFC-5578, PPP over Ethernet (PPPoE) Extensions for Credit Flow and Link Metrics
    - Informative Document
    - Similar Idea, but very complex with to many parameters that cannot be set well.
  - Dynamic Link Exchange Protocol (DLEP) (draft-ietf-manet-dlep-00)
    - Similar to RFC-5578, but does not utilize PPPoE
    - Router centric
    - Session oriented
  - Link properties advertisement from modem to router (draft-wood-dna-link-properties-advertisement-01)
    - Uses UDP multicast to advertise link characteristics
    - Simple
- Demonstrate usability in C++ implementation of Saratoga
  - Listen for on multicast channel to set rate-limit
  - Can test in Global Hawk Protocol Testbed.